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A MODERN APPROACH TO THE PREVENTION OF CARIES IN CHILDREN USING

FLUORIDE-PRESERVING DRUGS.

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Abstract. The article provides a literary review of the prevention of dental caries in children. The main focus is on exo and endogenous fluoride prophylaxis, which is one of the main methods of preventing tooth decay.

Keywords: dental caries, prevention, children, hygienic training, fluoride, fluoridation, focal demineralization.

СОВРЕМЕННЫЙ ПОДХОД К ПРОФИЛАКТИКЕ КАРИЕСА У ДЕТЕЙ С ИСПОЛЬЗОВАНИЕМ ФТОРСОХРАНЯЮЩИХ ПРЕПАРАТОВ.

Аннотация. В статье представлен литературный обзор профилактики кариеса зубов у детей. Основное внимание уделено экзо- и эндогенной фторпрофилактике, которая является одним из основных методов профилактики кариеса зубов.

Ключевые слова: кариес зубов, профилактика, дети, гигиеническое обучение, фтор, фторирование, очаговая деминерализация.

The problem of dental caries, despite the progress achieved in reducing its prevalence and intensity worldwide, continues to occupy a leading position among other dental illnesses In accordance with modern theories of the etiology and pathogenesis of caries, the disease is considered multifactorial. In its formation and development, significant role belongs to a complex of hereditary, congenital and acquired factors, as well as poor nutrition, low fluoride content in drinking water, presence of general somatic diseases, exposure to adverse environmental factors, etc. Early prevention of dental caries in the preschool period is one of the urgent tasks of modern dentistry, since a significant proportion of children suffer from its complications, starting from a very early age. The problem of early stages of dental caries (focal demineralization) in the last decade has been solved by using special remineralizing drugs. In the early years, remineralizing agents included separately preparations containing ions of micro- and macroelements of fluorine, calcium, and phosphorus. Currently, searches are underway for new preparations similar in composition and properties.

There are a large number of publications in domestic and foreign literature on the use of various methods and means of preventing dental caries in children, as well as on the development

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of general and local measures to prevent it. According to these ideas, the ways of preventing this disease should be built, of which there are currently three: primary; secondary and tertiary prevention of caries. Primary prevention of caries in children should begin in the neonatal period.

Numerous works by scientists from foreign countries are devoted to early diagnosis, prevention and rational treatment of early childhood caries. It has been established that one of the factors in the violation of this system of equilibrium of the oral cavity is over-acidification of saliva, when taking food rich in carbohydrates. A decrease in the pH of the oral fluid leads to a decrease in its mineralizing potential. Analysis of literary sources shows that in recent years, new methods of primary prevention of dental caries have been constantly improved and introduced. It has been established that most of these measures, aimed at eliminating the etiological factors that cause dental caries, are related to methods of primary prevention, which help reduce the growth of dental caries. In countries around the world and the CIS, many studies have been carried out on the etiology and pathogenesis of caries and prevention of its prevention, the intensity of caries in children has been significantly reduced. However, the issue of preventing dental caries in children remains an important and pressing problem, since the high incidence of caries in children poses a real threat to the health of the younger generation. It is impossible to solve the issues of preventing childhood caries without studying and creating preventive anti-caries programs that can cope with the disease of preschool children. It is an undeniable fact that the cariogenic situation in the oral cavity develops more actively and is clinically manifested faster with poor oral hygiene, due to abundant plaque and tartar. Improper oral care contributes to the appearance of soft plaque, which prevents the necessary macro- and microelements from entering the tooth enamel, thereby disrupting the enamel maturation process. Timely and effective removal of plaque reduces the risk of the implementation of the cariogenic properties of bacteria and organic acids. In the organization of preventive measures for all dental diseases, including dental caries, is the hygienic education and upbringing of the population, especially children. At first glance, proper oral hygiene care is simple and accessible. But, the very process of organizing and conducting hygienic education and upbringing among preschool children is complex. According to most researchers, it is advisable to start hygienic education and upbringing with children attending preschool educational institutions: first the younger (3-4 years old), then the middle (4-5 years old) and then the older (5-6 years old) groups. However, it should be noted that individual oral hygiene in preschool children should be carried out, first of all, by their parents. It is important to accustom a child to oral hygiene from an early age. By their example, parents should show the child in a playful way how to brush their teeth. Moreover, the child must do everything himself, even if clumsily, but in the future he will develop a new habit of brushing his teeth twice a day.

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 The most effective and feasible strategy for combating dental caries in young children is

the introduction of healthy oral hygiene habits and the promotion of dental care methods at home.

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A number of authors have convincingly shown that proper oral care reduces the intensity of the growth of the caries process [2; 17]. According to them, the most significant risk factors for the development of caries include a violation of the composition and properties of mixed saliva, as well as the growth of the development of oral microflora [6]. Among the most widespread and popular means of preventing dental caries in children, the use of various fluoride-containing drugs undoubtedly plays a priority role. Caries the preventive effect of fluoride is based exclusively on an increase in the rate of remineralization of enamel due to an increase in the concentration of fluoride in saliva. The anti-caries effect of fluoride is associated with three mechanisms of action.

Firstly, fluorides interact with one of the main mineral components of dental tissues - hydroxyapatite -to form a very stable compound - hydroxyfluorapatite. As a result, the permeability of enamel decreases and its resistance increases. Secondly, fluoride has a depressing effect on the growth of oral microflora due to the inhibitory effect on carbohydrate metabolism enzymes. As a result, the intensity of carbohydrate breakdown and acid production decrease.

Thirdly, fluorides affect the metabolism of the protein phase of enamel, participating in the formation of teeth and, consequently, their resistance to caries.

The effect of fluoride on the occurrence of pathological changes in teeth was discovered unexpectedly, when a connection was established between the increased fluoride content in water and the presence of dental and bone fluorosis. By introducing fluoride preparations into drinking water and, conversely, defluoridating water for the prevention of fluorosis, the possibility of preventing caries was proven. Effective fluoride prevention of dental caries is carried out mainly in two ways - the use of fluorides locally and internally, i.e. there are two main ways: a) systemic - the intake of fluorides into the body with water, salt, milk, in tablets or drops; b) local: the use of solutions, gels, toothpastes, varnishes. Based on the needs of the body, with proper intake of fluoride-containing drugs, it is easy to compensate for the lack of fluoride. In order to systematize the inclusion of fluoride in the body and in the hard tissues of the teeth, the WHO Expert Committee suggests differentiating the methods of fluoride prevention of dental caries as endogenous and exogenous.

In the endogenous method of caries prevention, the inclusion of fluoride in the body is carried out by fluoridation of drinking water, table salt, milk, as well as the use of fluoridecontaining tablets and drops, etc. The exogenous method of prevention includes:

- rinsing the mouth with diluted fluoride solutions;

- the use of fluoride-containing toothpastes;

- the application of fluoride-containing gels, solutions and varnishes, as well as the combined use of fluorine compounds.

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In programs for the prevention of dental caries in children, one of the alternative systemic methods is the use of fluoridated milk. A necessary condition for its implementation should be a long-term forecast of the availability of sufficient milk in the region. Milk has long been of interest to a number of researchers in the field of dentistry, since it is a high-calorie food product for children, containing lactose, calcium and phosphorus. This composition of the product allows milk to actively participate in the process of remineralization of tooth enamel. It has been proven that taking fluoridated milk for several years does not cause the accumulation of fluoride in the child's body and is safe for his health. Milk fluoridation is carried out in England, Bulgaria, Chile, China, Thailand, Hungary and in many cities of the CIS countries, such as Russia, Belarus, Ukraine and other countries. The positive effect of prevention was evidenced by the prevalence and intensity of caries, the increase in the intensity of caries, acid resistance and the rate of remineralization of tooth enamel. In particular, the use of fluoridated milk has led to a significant and reliable reduction in the prevalence and intensity of caries in permanent teeth. A fairly cheap and relatively effective method of endogenous fluoride use in the mass prevention of dental caries is fluoridation of table salt. This method is mainly widely used in different areas of the city with different fluoride content in drinking water. It has been established that regular, and in an optimal dose, consumption of fluoridated salt contributes to an increase in non-specific resistance of the oral cavity in preschool children. Fluoridated salt contributes to an increase in the concentration of fluorides in the oral cavity throughout life. In the course of the studies, it was concluded that the intake of fluoridated salt containing 250 mgF/kg is more appropriate for the prevention of dental caries than fluoridated drinking water.

A number of studies conducted in different countries have shown that the use of salt containing fluoride in a concentration of 90-350 mg/kg significantly reduces the intensity of dental caries. The most convincing data on the effectiveness of the method were obtained in Venezuela, Colombia, Sweden, etc. As a rule, the recommended concentration of fluoride in salt today is 250 mg/kg. In the world, experience in the use of salt fluoridation is also available in a number of countries - Switzerland (more than 40 years), France, Costa Rica, Jamaica, Germany. To do this, fluorides are added to highly purified salt by mixing to the required concentration per 1 kg of salt.

Comparative studies of water and salt fluoridation methods were conducted in terms of their effectiveness, safety, and monetary costs. According to their data, despite the effectiveness of each method, due to technical, financial, political, and other problems, they cannot be implemented everywhere. The disadvantages of using fluoridated salt include the difficulty of distributing the salt, the use of very complex technology, difficulties in the method of selecting an individual dosage, as well as mandatory monitoring.

For the mass prevention of dental caries in children in conditions where it is not possible to fluoridate drinking water or individual food products (milk, salt), fluorine can be introduced into the body of children in the form of tablets at the rate of its daily optimal intake of 1.2-1.6 mg.

Currently, sodium fluoride (NaF) is widely used as fluoride-containing tablets, since it dissociates quite easily into active fluoride ions, is well fixed in dental plaque and in the mucous membrane of the oral cavity. One of the most important advantages of taking sodium fluoride tablets orally in the process of preventing dental caries is the "flexibility" of this method. It allows you to introduce fluoride exactly at those periods when it is most necessary, and you can also accurately set the dose of the microelement taking into account the age characteristics of the body.

The anti-caries effect of using sodium fluoride tablets depends primarily on the age at which it begins to be taken, as well as the regularity and duration of their use. The dose of sodium fluoride should be as follows: 0.25 mg - up to 2 years; 0.5 mg - from 2 to 4 and 1 mg - from 5 years. Taking the tablets is organized by preschool teachers or medical workers. A more attractive way of preventing caries is the so-called local fluoridation with simple fluoride and fluoride amine.

Treatment of enamel with these salts, which are part of varnishes or gels, leads to a chemical reaction with the enamel and the formation of relatively large-crystalline calcium fluoride, which freely covers the surface of the tooth ename. Throughout the experiment, the accumulation of minerals when using liquids with fluoride showed a linear dependence on time, and even for four weeks there were signs of the possibility of further mineral absorption.

Thus, the analysis of numerous information presented in the literature indicates that fluoride deficiency in children's bodies leads to delayed eruption and specific tooth decay, brittleness of bones, teeth, etc. The most active and effective preventive effect of fluoridecontaining preparations is manifested during the period of maturation of tooth enamel, i.e. in childhood. In adulthood, the anti-caries effectiveness of preparations is significantly reduced.

Therefore, in order to prevent the development of dental caries, fluoride prophylaxis is advisable to be carried out in childhood.

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